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Squire, Sanders & Dempsey

Counsellors at Law
1201 Pennsylvania Avenue, N.W.
P.O. Box 407
Washington, D.C. 20044-0407

U.S. Offices:
Cleveland, Ohio
Columbus, Ohio
Jacksonville, Florida
Miami, Florida
New York, New York
Phoenix, Arizona

International Offices:
Brussels, Belgium
Budapest, Hungary
London, England
Prague, Czech Republic

Telephone: (202) 626-6600
Cable Squire DC
Telecopier: (202) 626-6780

Direct Dial Number

(202) 626-6634

September 28, 1995

RECEIVED
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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Ex Parte Presentation -- PR Docket No. 92-235

Dear Mr. Caton:

On Thursday, September 28, 1995, representatives of the Boeing Company made an ex parte presentation to Daniel B. Phythyon and Herbert W. Zeiler of the Wireless Telecommunications Bureau. Representing Boeing were Sheldon R. Bentley and John D. Warner of the Boeing Company and the undersigned of this Firm. The views expressed on behalf of Boeing are reflected in the enclosed materials, copies of which should also be placed in the record of CC Docket No. 92-297, GN Docket Nos. 90-357 and 93-252, and PR Docket Nos. 89-52, 93-144, and 93-253.

Please let us know if you have any questions.

Sincerely,

Joseph P. Markoski

/jef
Enclosures

cc: Daniel B. Phythyon
Herbert W. Zeiler

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Frequency Spectrum Issues

Ex Parte Presentation -- CC Docket No. 92-297;
GN Docket Nos. 90-357 & 93-252; [redacted]
89-52, 92-235, 93-144, & [redacted]

The Boeing Company

The Boeing Company

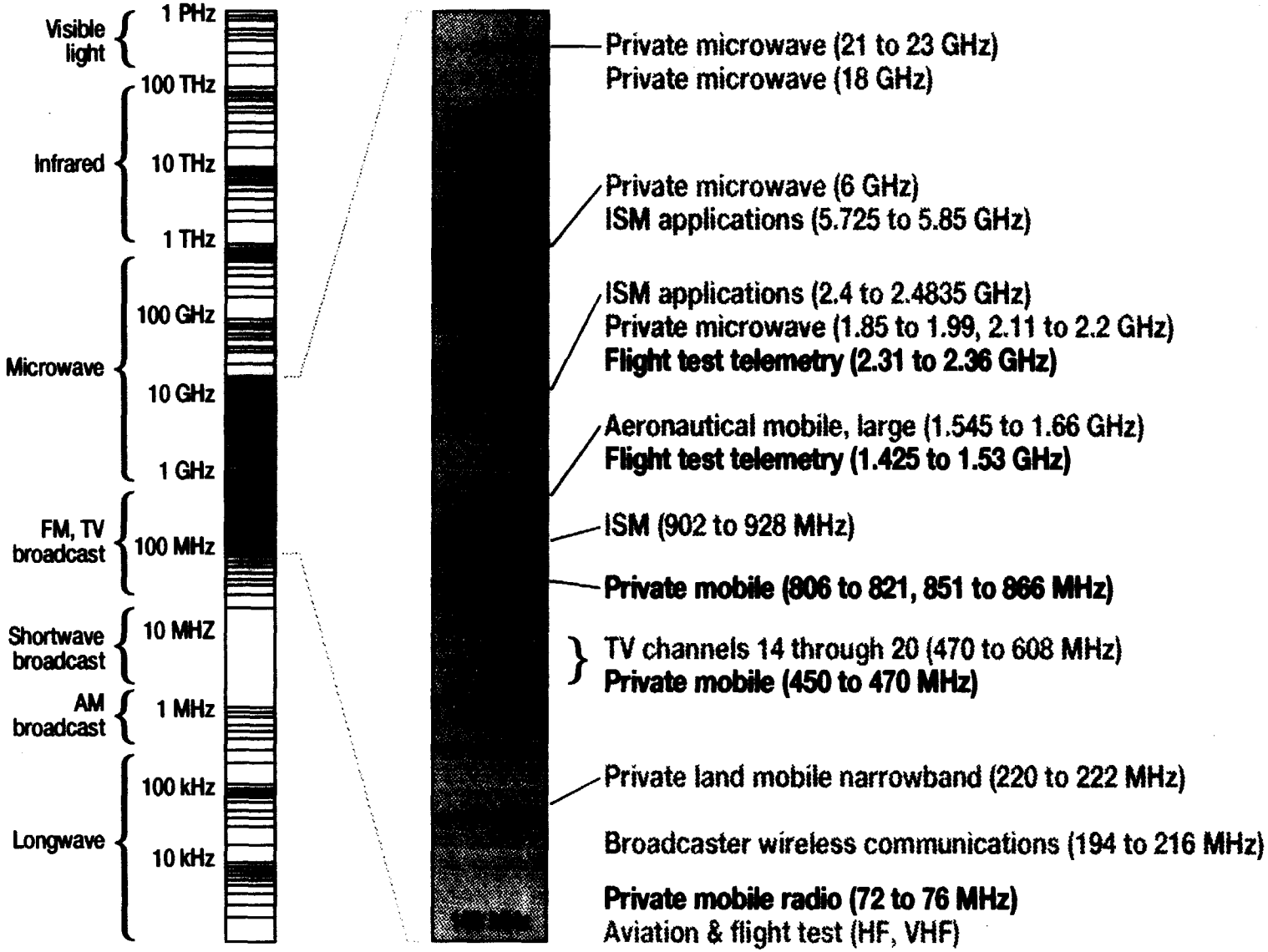
(FY 1994)

Annual Revenues	$21,924.M	
Foreign Sales	$11,844.M	
Employment		
◆ Employees (average)	119,400	individuals
◆ Subcontractors	10,666	companies

Facilities

- Washington (Operations cover 1,300 Square Miles)
- Alabama
- California
- Kansas
- Montana
- Pennsylvania
- Texas
- Subcontractors - all 50 states

Major Boeing Spectrum Uses



Boeing Spectrum Uses

Boeing Does Not Use Spectrum to Provide Services to Third Parties

Boeing Uses Spectrum for Safety and Health Reasons:

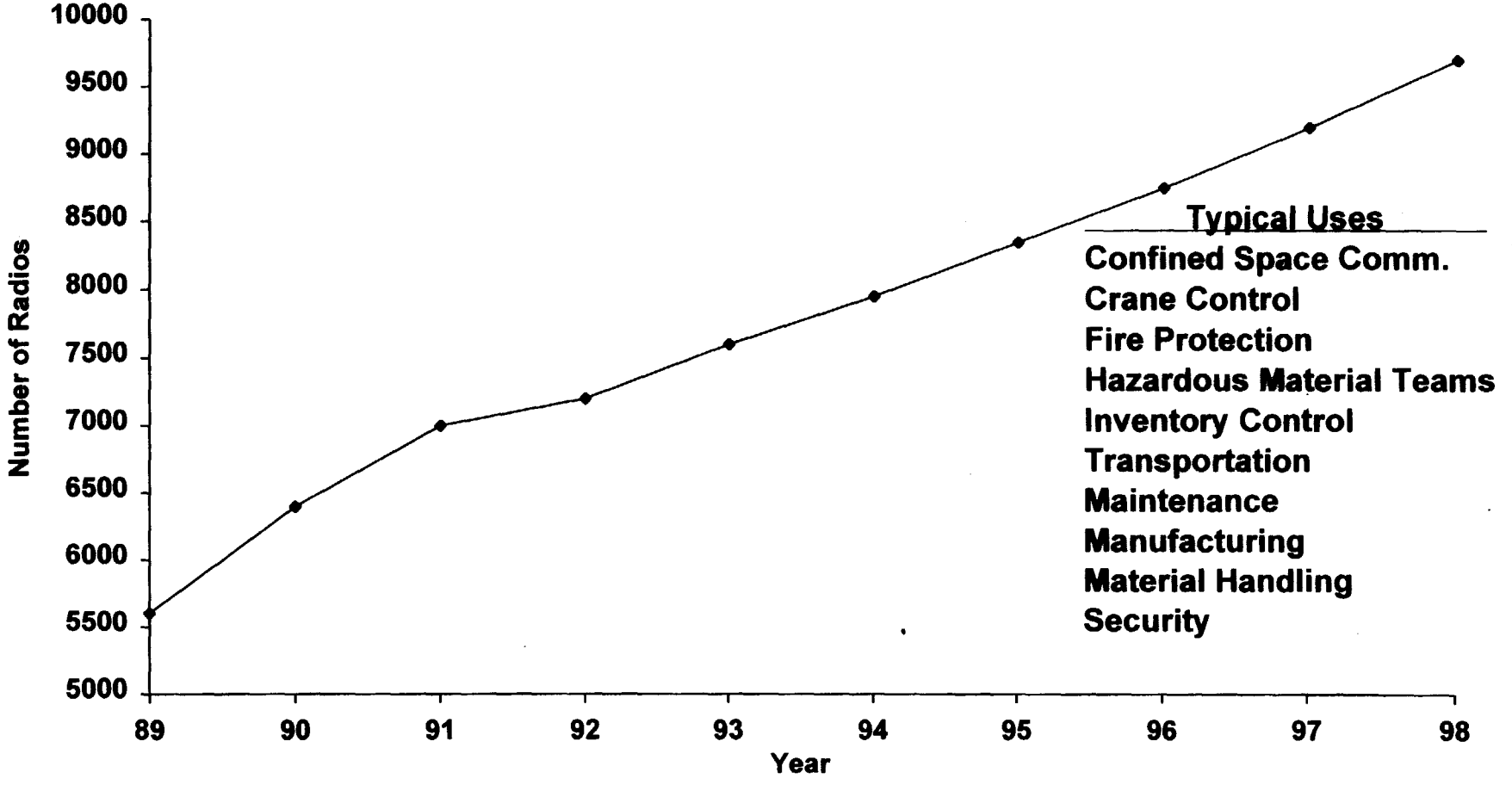
- Flight test telemetry
- Regulatory compliance -- Communication System for Confined Hazardous Areas (CSCHA), Hazardous Material (HazMat) response, "man-down" alarms
- Fire, security, alarms, emergency response, ties to municipalities for mutual aid

Boeing Uses Spectrum for Productivity Improvement:

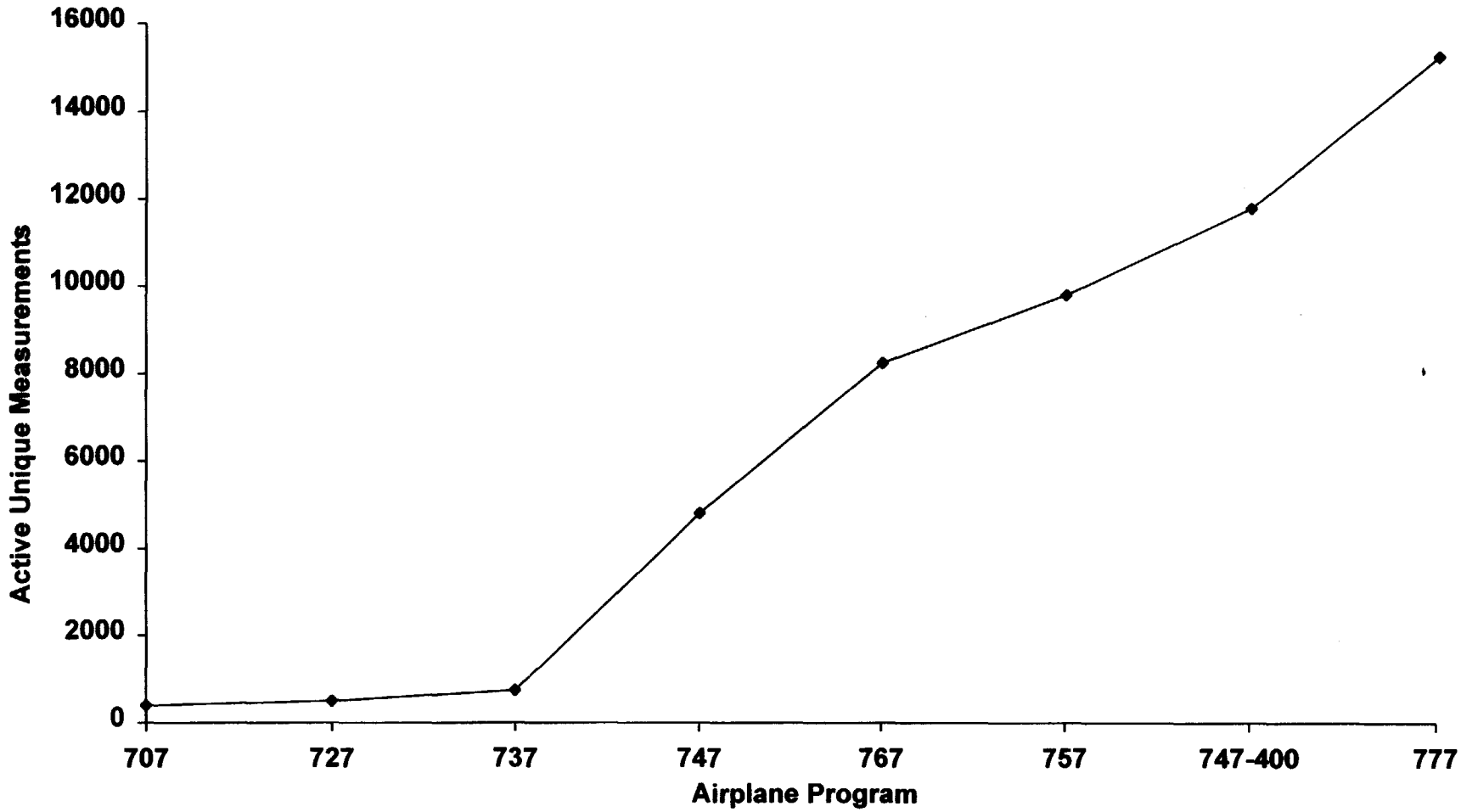
- Fabrication, machine programming, control and monitoring, cranes, material handling
- Data links, robotics, wireless local area networks (LANS), telecommunications backup, R & D
- Transportation

Boeing Foresees a Growing Demand for Spectrum Uses

Puget Sound Area Radio Growth



Flight Test Measurement Growth 1954 - 1995



Future Telemetry Projections

Bandwidth and Capacity Requirements Are Being Driven by New Technologies:

- Faster data buses and flight safety validation requirements
- Airframe and digital flight controls designed as integrated systems
- Real-time video needs to evaluate new structural materials
- Correlation of visual data and test sensors

Bandwidth Need Is Greater Than Linear With Time

Year	Airframe	Data Points	Bandwidth
1954	707	300 (approx.)	200 kHz
1995	777	40,000	20+ MHz

Spectrum Use By Boeing Customers

Commercial Airplane Customers

◆ Communications	Private Land Mobile, HF & VHF Air-Ground-Air and Air-Air Comm., ACARS, SATCOM
◆ Navigation	GPS, Differential GPS, Radar, T/CAS, DME, Altimeters, Rescue Beacons, Transponders, Weather Radar, FANS
◆ Performance reporting	HF/VHF Datalink
◆ Passenger services	Cabin Service, In-Flight Telephones, Faxes, E-mail, Sky Radio, DBS-TV

Defense Customers

◆ Military	VLF, HF, VHF, & UHF Comm. Links, DGPS, DME, Telemetry, ILS, C-Band Remote Navigation System, Synthetic Aperture Radar, Microwave, Cross Band EMI testing
◆ NASA	GLS, TT&C (TLM) Uplink, TDRS Downlink,

Satellite Customers

◆ Direct Broadcast Satellite	A/C Cabin Entertainment System
◆ Communications	A/C Test Data, Sea Launch, Iridium
◆ Earth resource mapping	
◆ Weather	

Spectrum Costs

Radio Spectrum Is Not "FREE"

Boeing's Costs Include:

◆ Equipment investment (book value)	$108.M (1994 Dollars)
◆ Maintenance	$2.M per year (approx.)
◆ FCC license application fees, FCC regulatory fees, spectrum coordination fees, staff, coordinators and association/coalition memberships	$1M per year (approx.)

These Costs Are Not Unique to Boeing

Boeing and Its Customers Therefore Have Very Real Economic Incentives to Use Spectrum Efficiently:

- ◆ To reduce costs and remain competitive
- ◆ To use existing spectrum allocations for new applications

Spectrum Allocation and Licensing

Congress Has Directed the FCC in Allocating and Licensing Radio Spectrum to:

- Promote the public convenience, interest, and necessity
- Promote the development and timely deployment of new and innovative radio services and technologies
- Promote the efficient and intensive use of radio spectrum
- Recover, where appropriate, "a portion of the value of the public spectrum resource made available for commercial use"

Spectrum Realities

Industry Needs BOTH Private Radio and Commercial Radio Spectrum and Services to Satisfy Its Communications Needs

Commercial Mobile Radio Services Provide Effective and Efficient Solutions to Many of the Communications Needs of Industry

- Cellular -- sales, some transportation
- Direct Broadcast Satellite (DBS) -- distribution of information
- In-flight phone -- business travelers

Private Radio Often Provides the ONLY Solution to Many Communication Needs

- Emergency services -- natural disasters, accidents, emergency response, fires
- Safety services -- "man down" alarms
- Factory floor operations -- cranes, other machinery

Flight Test Telemetry -- Unique to Aerospace

Spectrum Realities
(continued)

Some Needs Can Be Satisfied by Both Commercial Mobile and Private Radio Services, But With Varying Degrees of Cost and Efficiency

- Cellular provides mobile communication, but is inflexible and suffers from inadequate coverage, security, and priority of services
- Commercial mobile services can be up to 40 times more expensive than private radio
- Commercial mobile radio service providers have not responded to the needs of industry for tailored wireless services in "thin" markets

Boeing Does NOT Treat All Radio Services as "Add-On" Capabilities

- Boeing integrates radio services into its manufacturing processes and optimizes for efficiency and flow time.

Spectrum Economics

Auctions Should Only Be Utilized Where the Principal Use of the Spectrum Will Be to Provide Communications Services to Third Parties for Profit.

Auctions Are Appropriate for Such Services Because They Produce Revenues That Reflect the Value of the Business Being Entered, Rather Than the Value of the Spectrum Itself.

Private Users Will Almost Always Bid Less Than Entrepreneurs Planning to Use Spectrum to Provide Service to Third Parties for Profit

If Private Radio Spectrum Is Auctioned, Users Will Be Compelled to:

- pay economically unrealistic prices for spectrum, thereby damaging their competitiveness
- significantly change their operations, e.g., off-shore production
- attempt to recoup their "investment" by diverting resources and service to third parties

Spectrum Economics
(continued)

Competitive Bidding Would Preclude the Use of Private Radio Spectrum by Boeing because:

PCS Auctions Produced $8.733B (ten year licenses)
(or $6.50 per kHz per 1,000 sq. miles/year) [1]

Applying the Same Results to the License Period:

- Boeing would increase costs by approximately $40M
- The aerospace industry would increase costs by approximately $250M [2]
- All U.S.-based manufacturers would increase costs by approximately $6B [3]

References:

1 Nathan Associates, Inc.
2 Aerospace Industries Association of America, Inc.
3 Ibid.

Spectrum Economics
(continued)

If the FCC Wishes to Recover "a Portion of the Value of the Public Spectrum Resource", Incentive Based License Fees Are a Viable Alternative to Auctions for Private Radio Spectrum

If Properly Structured, License Fees Should:

- Promote the development and timely deployment of new and innovative radio services and technologies
- Promote the efficient and intensive use of radio spectrum
- Not burden licensees who use spectrum efficiently

Spectrum Economics
(continued)

License Fees Should Provide Licensees With an Incentive to Use Spectrum Efficiently

- A graduated fee structure should be adopted
- Inefficient technologies should result in higher license fees than efficient state-of-the-art technologies
- Efficiency can be objectively measured by a matrix of factors such as: [1]

Per channel bandwidth	(Newer equipment)
Spectrum efficient emissions (TDMA/CDMA)	(Spectrally efficient technology)
Number of units per channel	(Channel density)
Duty cycle	(Use density)

- License fees should not be so high as to discourage use of efficiency-enhancing state-of-the-art of radio technology

Reference:

1 Nathan Associates, Inc.

Summary of Boeing Perspective

Spectrum Management Should Reflect the Differences in User Purposes

- Private use -- managed by coordination and cooperation

or

- Commercial use -- managed by free market competition

Method of Value Recovery

Method	Private Use ("Private Radio")	Third Party Use (Resale)
◆ Competitive Bidding	Inappropriate	Appropriate
◆ License Fees	Appropriate	Inappropriate

Role of the FCC

- There Is a Continuing Need for Spectrum Management
- The FCC Is the Appropriate Body to Manage Spectrum
- Market Economics Should Not Replace the Public Interest